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**Patent Document**
**'Offenlegungsschrift' 25 08 628**
**Floor Document**

is a true and faithful translation from the original German language and that the professional translator is fluent in both the English and German languages.

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# Description of the Invention

## Floor Component

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The invention concerns a floor component which consists of a composite wood sheet, on the bottom of which a continuous sheet of synthetic foam has been bonded.

Such a floor component can be inserted between the sub-floor construction and the floor covering, whereby it is set directly onto the sub-floor, i.e., made of cement, or nailed to a wood base, or is suspended on loose fill. It then replaces one of the layers on the sub-floor, such as bitumen. Putting the layer of synthetic foam on the underside of the composite wood sheet is beneficial as a heat shield and for sound dampening, especially with footsteps. It is best to use rigid foam sheets made of Styropor. The composite wood sheets are composed of fine wood shavings or fibres bonded together with synthetic resin, where the density of the synthetic bond is kept thin enough that the wood fibres can easily absorb moisture, be it liquid or vaporous, from the environment, which can then be dispersed within the fibres themselves.

A result of this characteristic of the composite wood sheet is that when there is penetration of moisture from its underside, that is from the sub-floor, as for example resulting from a moisture equalization between the room below and the room above, the bottom stratum of the composite wood sheet absorbs more water than the one on top. Because of the expansion of the wood fibres due to moisture in the lowest stratum, concave warping of the composite wood sheet occurs. The

same effect also occurs when moisture evaporates too rapidly from the surface, especially then when the top surface layer dries out quicker than the moisture infiltrates from below. On the other hand, in the case of a greater infiltration of moisture from the top, an opposite convex warping effect can occur. In that instance, the foam sheet isn't creating an adequate moisture barrier. Moreover, it will be saturated with water in a vapour state. Should a higher vapour pressure exist in the room under the sub-floor, and in the sub-floor itself, than in the room above, moisture would seep into the composite wood sheet from below. As a result of the drying on the top surface, uneven moisture levels are created within the sheet, so that it warps concavely. On the other hand, vapour pressure can loosen the bond between the composite wood sheet and the foam sheet, so that breaks occur in which condensation can accumulate.

The purpose of the invention is to prevent this kind of damage, especially the warping of the composite wood sheet as a result of moisture absorption.

This problem is solved in that the invention provides for parallel groove-formed cavities in the top and bottom load-bearing surfaces of the foam sheet, which have crosspieces in place that are smaller than they are, and that the cavities of the one load-bearing surface are offset against those of the other load-bearing surface in such a way that the crosspiece of the one load-bearing surface is situated opposite the center of a cavity on the other load-bearing surface. The groove-formed cavities can have a rectangular or trapezoid cross section, or one with rounded edges. The width of the cavities ideally measures 20 mm, the depth 5 mm.

The top load-bearing surface of the foam sheet, along with the surface of the bearing side of the crosspieces, is bonded to the composite wood sheet. The bonding is done most efficiently in point form 2 to 3 cm apart, to prevent any warping of the composite wood sheet resulting from any moisture absorbed from the adhesive.

The foam sheet, with the bearing surface of the crosspieces on the bottom of its own load-bearing surface, rests on base supports, either suspended on fill or, if level enough, directly on the sub-floor.

The groove-formed cavities on the bottom load-bearing surface of the foam sheet create, in conjunction with the installation surface of the composite wood sheet, channels in which the water vapour coming from the sub-floor can exit and be drained out to the wall. There it will be absorbed by the plaster and masonry or channelled into the open gap between the seam of the floor component and the wall to the space above the floor. The water vapour rising from below is thus channelled around the moisture sensitive composite wood sheet. The necessary dispersion of the vapour within the channels formed by the cavities is itself created by the pressure of the vapour coming from below.

Any infiltration of water from below, in a vapour or liquid state, into the interior of the foam sheet is only possible on the narrow surfaces of the bottom crosspieces. However, the moisture cannot reach the underside of the composite wood sheet, as its course inevitably leads into the channels formed by the groove-formed cavities of the upper load-bearing surface of the foam sheet, where any water vapour collected is drained in the direction of the wall. The pathway to the crosspieces on the top

load-bearing surface of the foam sheet and the installation surface on the composite wood sheet runs along the bottom surface and the side walls of the groove-formed cavity, that is to say, over a considerably lengthened pathway, where the moisture is dispersed as vapour in the above-mentioned channel. To lengthen this course as much as possible and to prevent moisture seeping vertically directly into the composite wood sheet, all the groove-formed cavities are kept wider than the crosspieces.

In the case of temperature differences or fluctuations, the susceptible condensation can only collect at the bottom of the channels and again evaporate there. It will once again be dispersed as vapour in the direction of the walls. A break in the bond between the composite wood sheet and the foam sheet is prevented according to the invention's design stipulations in that, in the first place, no nominal moisture can reach the bond and, secondly, that the accumulating condensation has to collect in the cavities of the synthetic sheet.

Furthermore, the design of the crosspieces and the cavities is beneficial for sound absorption, as even here due to the reciprocal offsetting of the cavities

and crosspieces and due to the larger width of the cavities, the course length for the sound to travel is extended. In addition, because of the aforementioned design, the elasticity of the sheet is increased, and its intrinsic rigidity and, along with it, the resonance effect of the foam sheet are reduced.

Because of the described design of the foam sheet, any moisture seepage into the composite wood sheet resulting from direct contact from below can be stopped, not, however, any water that is absorbed from the general humidity existing in the air underneath. If the air here has a greater moisture content than in the room above the composite wood sheet, it could bring about wide-spread moisture levels in the composite wood sheet in its lower layers, contrasted to a rapid drying in the upper layers, so that as a consequence concave warping shall occur, for example, should the room above have a higher temperature . To prevent this, according to the invention, a vapour barrier is adhered to the top side of the composite wood sheet. This can expediently be done by impregnating it with a vapour barrier agent in liquid form. This prevents the moisture taken up from below by the composite wood sheet from too rapidly evaporating upwards and an unequal distribution of moisture from spreading across the cross section of the composite wood sheet.

Accordingly, moisture cannot spread unevenly into the individual sheet layers, and the sheet can, moreover, expand evenly and without warping in all its strata. On the other hand, should the moisture content reaching the upper surface of the wood composite sheet be higher than that of the moisture rising from below, the vapour barrier layer does prevent an uneven expansion.

An example of the invention is described below in greater detail and is illustrated in the drawing, which shows

a vertical cross section of the floor component, based on the invention, and the underlying sub-floor.

The floor component illustrated shows on its top side a composite wood sheet 1 with a thickness of 22 mm. The latter is joined tongue-and-groove at the rabbet joints to the composite wood sheets of other components which are offset in unison. The top of the composite wood sheet 1 can be provided with a floor covering chosen according to one's taste, i.e., by gluing. On the underside of the composite wood sheet a foam sheet is provided for,

which shows the groove-formed cavities 3 on the top side and 4 on the underside. These cavities have crosspieces 5 on the top side and 6 on the underside, whose cross-wise dimension is smaller than those of the cavities. In the example given, the ratio is 14 to 17 mm. The cavities run along each side parallel to each other and also parallel to the cavities of the respective opposite side. The foam sheet 2 consists of synthetic foam, for example Styropor, with a compressed cell structure, to obtain better sound absorption. On the bearing surface of the crosspieces 5 the foam sheet 2 is bonded point form to the composite wood sheet 1, which means the crosspieces are followed lengthwise by a row of glued points, which are a distance of 3 cm apart. The foam sheet 2 sits with the bearing surfaces of the crosspieces 6 directly on the cement base 7 to which the floor component can be fastened. A layer 8 of a vapour barrier agent is injected into the upper surface area of the composite wood sheet.

## Patent Claims

Patent Claims

1. Floor component, composed of a composite wood sheet, on whose underside a continuous sheet made of synthetic foam is bonded,
characterized in that on the top and bottom load-bearing surface of the foam sheet (2) parallel, evenly wide groove-shaped cavities (3,4) are provided for, which have crosspieces (5,6) in between that are narrower, and that the cavities (3,4) on the one load-bearing surface of the foam sheet (2) across from the cavities on the other load-bearing surface are offset in such a way that each crosspiece (5,6) on one of the load-bearing surfaces is across from the center of the cavity on the other load-bearing surface.

2. Floor component according to Claim 1
Characterized in that the groove-formed cavities (3,4) demonstrate having a rectangular, trapezoid cross section or one like it with rounded corners.

3. Floor component according to Claim 1,2
Characterized in that the width of the cavities are 20 mm and their depth 5 mm.

4. Floor component according to Claim 1,2,3 Characterized in that the foam sheet (2) is bonded in point form to the composite wood sheet (1) at the bearing surface of the crosspieces (5) of the foam sheet (2).

5. Floor component according to Claim 1,2,3,4, Characterized in that a layer (8) of a vapour barrier agent is injected into the top surface of the composite wood sheet (1).

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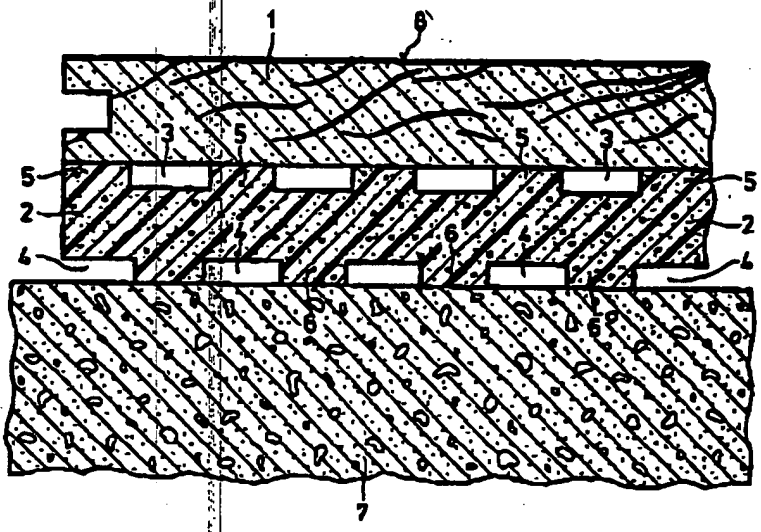


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